

rains, moderate-sized mountains, and sharp terrain boundaries. These features are chosen because the goodness of fit is likely to be most affected either by departures from normal incidence angles or by sharp changes in terrain type within a single footprint. Most large features that are elevated with respect to their surroundings will suffer from steep slope effects, and smaller coronae and impact craters will probably suffer due to rapid changes in their appearance within a single footprint (10–20 km).

Since the surface properties of Venus can be derived only through models, it is crucial that surface scattering models be as accurate as possible. The characterization of terrain and the physical quantities that are estimated from surface properties presume an acceptable level of precision in the data, and are misleading if truly incorrect. Once the problem areas are correctly identified, better estimates of surface properties may be obtained through models tailored to particular fitting difficulties. These surface properties, in turn, will provide a means to estimate physical characteristics of the planet's surface, and address the underlying geological processes.

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THE SOLAR WIND INTERACTION WITH VENUS. J. G. Luhmann, IGPP-UCLA, Los Angeles CA 90024-1567, USA.

The Pioneer Venus Orbiter (PVO) mission has played a key role in establishing the nature of the solar wind interaction with Venus [1]. Although earlier probes had determined that Venus presented an obstacle much smaller than the size of Earth's magnetosphere to the solar wind, they did not carry out *in situ* measurements pertaining to solar wind interaction studies at low enough altitudes to determine why. They also did not provide datasets of sufficient duration to study the variability of the interaction on both short (one day) and long (solar cycle) timescales [2].

The first 600 of the nearly 5000 orbits of PVO magnetometer data have been used to determine a very low upper limit ($\sim 10^{-5}$ of the terrestrial value) on the intrinsic dipolar magnetic moment of Venus [3]. The consequence of that low magnetic moment is that the solar wind interacts directly with the upper atmosphere and ionosphere. Relative to a dipolar field obstacle, the ionospheric obstacle is rather incompressible. A "bow" shock is observed to stand in front of the nearly Venus-sized ionospheric obstacle at a comparatively steady subsolar altitude of $\sim 1.5 R_V$ (Venus radii). This shock decelerates the supersonic solar wind plasma so that it can flow around the obstacle. It was found to change its average position in the terminator plane from about $2.4 R_V$ to $2.1 R_V$ as the solar cycle progressed from the 1978 orbit insertion near solar maximum through the 1986–87 solar minimum, and back again during the latest solar activity increase [4].

Between the bow shock and the ionosphere proper, the slowed solar wind plasma flow diverges near the subsolar point and makes its way across the terminator where it reaccelerates and continues anti-Sunward. The solar wind magnetic field, which is in effect frozen into the flowing plasma, is distorted in this "magnetosheath" region so that it appears to hang up or drape over the dayside ionosphere before it slips around with the flow. These features of the solar wind interaction are also seen when the obstacle is a dipole magnetic field, but there are two important distinctions.

In the wake of the Venus obstacle one finds an "induced" magnetic tail composed of varying interplanetary fields rather than

the constant fields of intrinsic origin [5]. This "magnetotail" is further seen to be populated by heavy (O^+) ions that are evidently escaping from the planet at significant ($\sim 10^{-25} s^{-1}$) rates [6]. These heavy ions are also observed in the dayside magnetosheath [7]. The interpretation is that ions are produced by both photoionization and solar wind electron impact ionization of the upper neutral atmosphere that extends into the magnetosheath. The flowing solar wind plasma with its imbedded magnetic field "picks up" the ions and carries them tailward. While many escape, some of the picked up ions impact the dayside atmosphere and sputter neutrals [8]. By these means, the solar wind interaction plays a role in the evolution of the Venus atmosphere, although its importance relative to other loss mechanisms is still undetermined. In any event, because the planetary heavy ion contribution to the plasma in the magnetosheath varies with the solar cycle, it may be the cause of the aforementioned shift in the bow shock position. For all the above reasons, researchers sometimes consider that the Venus-solar wind interaction is in many ways cometlike. These features are all a consequence of the weak intrinsic magnetism, and as such should be relevant to Mars [9] where future measurements are likely to further elucidate the scavenging processes.

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EXTENSIVE LAVA FLOW FIELDS ON VENUS: PRELIMINARY INVESTIGATION OF SOURCE ELEVATION AND REGIONAL SLOPE VARIATIONS. K. Magee-Roberts¹, J. W. Head¹, J. E. Guest², and M. G. Lancaster², ¹Department of Geological Sciences, Brown University, Providence RI 02912, USA, ²University of London Observatory, University College London, London NW7 2QS, UK.

Large-volume lava flow fields have been identified on Venus [1], the most areally extensive ($>50,000 km^2$) of which are known as "fluctus" and have been subdivided into six morphologic types [2]. Sheetlike flow fields (Type 1) lack the numerous, closely spaced, discrete lava flow lobes that characterize digitate flow fields. Transitional flow fields (Type 2) are similar to sheetlike flow fields but contain one or more broad flow lobes. Digitate flow fields are divided further into divergent (Types 3–5) and subparallel (Type 6) classes on the basis of variations in the amount of downstream flow divergence. Flows that are radially symmetric about a central source (e.g., volcanic shield or corona) are typical of Type 3 flow fields, whereas a similar but slightly asymmetric apron of flows about a central source is characteristic of Type 4 flow fields. A fan-shaped flow field that widens substantially in its distal regions is typical of Type 5 flow fields. Type 6 flow fields (e.g., Mylitta and Kaiwan Fluctus) are not radially symmetric about a central source and do not widen or diverge substantially downstream.

As a result of our previous analysis of the detailed morphology, stratigraphy, and tectonic associations of Mylitta Fluctus [3], we have formulated a number of questions to apply to all large flow fields on Venus. In particular, we would like to address the following: (1) eruption conditions and style of flow emplacement (effusion